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10/536,621	05/26/2005	Masahiko Nakamori	UNIU40.005APC	9275

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EXAMINER	
MACARTHUR, SYLVIA	

ART UNIT	PAPER NUMBER
1716	

NOTIFICATION DATE	DELIVERY MODE
06/14/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/536,621	NAKAMORI ET AL.	
	Examiner	Art Unit	
	Sylvia R. MacArthur	1716	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 April 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,7,13 and 15-22* is/are pending in the application.

4a) Of the above claim(s) *22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7,13 and 15-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 4/13/2010 have been fully considered but they are not persuasive. Applicant argues on page 5 paragraph 3 that the prior art of record fails to teach the light transmittance in the light transmitting region through the wavelength of 400-700 nm is 50% or more, or that a thickness of the light-transmitting region is 0.5 to 4 mm, and the light transmittance in the light transmitting region throughout the wavelength range of 600 to 700 is 80% or more. Even applicant states in the arguments that Ishikawa teaches a transmissivity of the window plate (transmission region) is 22% or greater this range includes the claimed range.

2. The examiner confirms that the prior art used in the rejection to Takashi is JP 11-77517.

3. Both Takahashi and Toru fail to teach the materials for forming the polishing region and light transmitting region are polyurethane resin. Nevertheless, polyurethane resin is a known material and used for its compliance, see col. 5 lines 17-38 of Halley et al. The motivation to use polyurethane resin as the material of construction for the pad of Takashi or Toru is that the material is known as a durable material for the harsh CMP environment. The transmittance of the material is an inherent physical property and thus if the same material is used to construct the pad i.e. polyurethane resin it will have the claimed transmittance as claimed.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-4, 7, 13, and 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa et al (US 2002/0042243) in view Shimomura et al (JP 2002-0759933).

Regarding claims 1-4, 12, and 20: Ishikawa et al teaches a CMP apparatus wherein the polishing pad includes a transparent window plate 31 (light transmitting region) and a processing region see abstract and figures. Figure 2 illustrates that the transmitting region is less than the wafer 17. Recall that the actual comparison of (D) to the wafer material depends upon the size of the substrate which is not part of the apparatus and is interpreted as a matter of an intended use. Figure 12 recited that the wavelength ranges from 400 to 800 nm. Note that the pad of Ishikawa et al anticipates i) and iii).

Ishikawa et al fails to teach the material for forming the polishing region is a fine-cell foam.

The prior art of Shimomura et al teaches a pad comprising three layers wherein 1 (polishing layer) 2 (resin layer) and 3 (laminate), Sections [006] –[007] discuss the materials used to construct each. The motivation to construct the pad of Ishikawa et al with the material as suggested by Shimomura et al is that the materials provide the optimal combination of flattening results and monitoring capability for a CMP pad that provides both polishing and monitoring of the wafer.

The physical properties of the layers are also taught by Shimomura et al and are an inherent property of the chosen material of construction, note a fine cell foam is taught with the range of diameter as 10-50 micrometers or less see [0013].Thus, it would have been obvious for

one of ordinary skill in the art at the time of the claimed invention to modify the apparatus of Ishikawa et al to provide both polishing and monitoring of a wafer.

Regarding claim 4:Section [0053] recites that the transmissivity is 22% or greater. See Fig. 16 wherein the differences among light transmittance is 5% or less.

Ishikawa fails to teach the materials of construction of the polishing and transmitting regions as newly recited.

Regarding claim 7: The shape is rectangular, see the Figures. Regarding claim 10: See [0020] polyurethane resin is the material of construction of the pad. Regarding claim 13: See Figures. Regarding claim 15: See [0091].

6. Claims 1, 7, 13,and 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takashi et al (JP 11-77517) in view of Halley (US 6,361,647) and Shimomura et al (JP 2002-0759933).

See the English abstract and the Figure on the English Abstract of Takashi et al teaches a polishing pad with a polishing region and a light transmission region where the light transmission region is illustrated as being rectangular. The figure illustrates that the polishing pad comprises characteristic iii) and that the polishing side comprises groove. Takahashi et al fails to recite that the polishing pad according to claims 1, wherein a scatter of the thickness of the light-transmitting region is 100 μm or less. The examiner interprets that this claimed range also includes the case of no or zero scatter, suggesting the need to minimize the scatter, as motivated by the desire for more accurate detection and process control. Furthermore, the scatter of the thickness depends upon such process parameters as the material of construction and the shape of the transmitting region.

The pad that results from modifying Takashi et al with Halley et al fails to teach the materials of construction of the polishing and transmitting regions as newly recited.

The prior art of Shimomura et al teaches a pad comprising three layers wherein 1 (polishing layer) 2 (resin layer) and 3 (laminate), Sections [006] –[007] discuss the materials used to construct each. The motivation to construct the pad of Takashi et al and Halley et al with the material as suggested by Shimomura et al is that the materials provide the optimal combination of flattening results and monitoring capability for a CMP pad that provides both polishing and monitoring of the wafer. The physical properties of the layers are also taught by Shimomura et al and are an inherent property of the chosen material of construction, note a fine cell foam is taught with the range of diameter as 10-50 micrometers or less see [0013]. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the apparatus of Takashi et al and Halley et al to provide both polishing and monitoring of a wafer.

Regarding the shape of the transmitting region, see Fig.7, 8, and 10. Applicant fails to provide a showing of the criticality of the actual percentages, these values can be optimized based upon such factors as the material of construction of the transmittance region and are known to effect the clarity of measurement and the overall endpoint measurement result, see In re Aller, 220 F. 2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to optimize the transmittance in the light transmitting region in order to optimize the measurement result in the recited wavelength ranges for use in CMP.

Takashi fails to specifically teach the length (D) is ¼ to ½ of the diameter of the wafer.(based on interpretations a) or b)). Nevertheless recall, that the inclusion of material or an article worked upon by a structure being claimed does not impart patentability to the claims. See In re Young, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935). Furthermore, the prior art of Halley (US 6,361,647) illustrates in Fig. 1A that it is conventional to have a pad with a smaller diameter than the wafer, see also col. 5 lines 29-39 wherein it is stated that the pad 140 radius is less than the radius of the wafer 10, typically around 20%.According to Halley the motivation to modify the conventional pad to be smaller than the substrate it treats is that it improves the degree of global uniformity. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the conventional pad to be smaller than the substrate it treats is that it improves the degree of global uniformity. Regarding claim 10: Takahashi fails to teach the materials for forming the polishing region and light transmitting region are polyurethane resin. Nevertheless, polyurethane resin is a known material and used for its compliance, see col. 5 lines 17-38 of Halley et al. The motivation to use polyurethane resin as the material of construction for the pad of Takashi is that the material is known as a durable material for the harsh CMP environment. The transmittance of the material is an inherent physical property and thus if the same material is used to construct the pad i.e. polyurethane resin it will have the claimed transmittance as claimed. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide polyurethane as the material of construction for the polishing pad.

Regarding claim 13: Takashi fails to teach that the pad does not have an uneven structure. See the figures. The motivation to modify the pad of Takashi is that allows for more uniform treatment of the substrate.

Regarding claims 18, 19, and 21: The hardness , compressibility and storage elastic modulus of the fine cell foam is an inherent property of the material chosen for the pad and is thus obvious as material of construction is the determining factor of the physical properties of the pad.

7. Claims 1-4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hasegawa Toru (JP 2002-324770) in view of Halley (US 6,361,647) and Shimomura et al (JP 2002-0759933).

See the English abstract and the Figure on the English Abstract of Toru teaches a polishing pad with a polishing region and a light transmission region where the light transmission region is illustrated as being rectangular. The figure illustrates that the polishing pad comprises characteristic iii) and that the transmitting section also comprises light transmittance in the wavelength range of 400-800 nm. Toru fails to recite that the polishing pad according to claims 1, wherein a scatter of the thickness of the light-transmitting region is 100 μm or less. The examiner interprets that this claimed range also includes the case of no or zero scatter, suggesting the need to minimize the scatter, as motivated by the desire for more accurate detection and process control. Furthermore, the scatter of the thickness depends upon such process parameters as the material of construction and the shape of the transmitting region. Absent a showing of persuasive evidence that the particular shape is significant, the examiner opines that the shape of the transmitting region is a matter of design choice and well within

knowledge and skill of one of ordinary skill in the art at the time of the claimed invention to optimize, see also In re Dailey, 357 f. 2D 669, 149 USPQ 47 (CCPA 1966). Applicant fails to provide a showing of the criticality of the actual percentages, these values can be optimized based upon such factors as the material of construction of the transmittance region and are known to effect the clarity of measurement and the overall endpoint measurement result, see In re Aller, 220 F. 2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to optimize the transmittance in the light transmitting region in order to optimize the measurement result in the recited wavelength ranges for use in CMP.

Toru fails to teach the length (D) of the transmitting region (see element 11, Figures 5 and 7) is ¼ to ½ of the diameter of the wafer, the examiner interprets this limitation as a matter of an intended use as the pad is claimed relative to the substrate which is not part of the apparatus. Recall, that the inclusion of material or an article worked upon by a structure being claimed does not impart patentability to the claims. See In re Young, 75 F. 2d 966, 25 USPQ 69 (CCPA 1935). Furthermore, the prior art of Halley (US 6,361,647) illustrates in Fig. 1A that it is conventional to have a pad with a smaller diameter than the wafer, see also col. 5 lines 29-39 wherein it is stated that the pad 140 radius is less than the radius of the wafer 10, typically around 20%.According to Halley the motivation to modify the conventional pad to be smaller than the substrate it treats is that it improves the degree of global uniformity. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the conventional pad to be smaller than the substrate it treats is that it improves the degree of global uniformity.

The pad that results from modifying Toru and Halley et al fails to teach the materials of construction of the polishing and transmitting regions as newly recited.

The prior art of Shimomura et al teaches a pad comprising three layers wherein 1 (polishing layer) 2 (resin layer) and 3 (laminate), Sections [006] –[007] discuss the materials used to construct each. The motivation to construct the pad of Toru and Halley et al with the material as suggested by Shimomura et al is that the materials provide the optimal combination of flattening results and monitoring capability for a CMP pad that provides both polishing and monitoring of the wafer. The physical properties of the layers are also taught by Shimomura et al and are an inherent property of the chosen material of construction, note a fine cell foam is taught with the range of diameter as 10-50 micrometers or less see [0013]. Thus, it would have been obvious for one of ordinary skill in the Toru and Halley et al Takashi et al and Halley et al to provide both polishing and monitoring of a wafer.

Regarding claims 2-4: The teachings of Toru and Halley were discussed above. The modification does not specifically state 50% or more/less of 80% or more/less, 90% or more, or 5% or less. However, since the claims are directed to a difference in transmittance, the initial and final values can be determined without undue experimentation. Applicant fails to provide a showing of the criticality of the actual percentages, these values can be optimized based upon such factors as the material of construction of the transmittance region and are known to effect the clarity of measurement and the overall endpoint measurement result, see In re Aller, 220 F. 2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to optimize the transmittance in the

light transmitting region in order to optimize the measurement result in the recited wavelength ranges for use in CMP.

Conclusion

8.THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-Th during the hours of 8 a.m. and 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

June 6, 2010

/Sylvia R MacArthur/
Primary Examiner, Art Unit 1716